General

Guideline Title

Practice parameter update: evaluation and management of driving risk in dementia. Report of the Quality Standards Subcommittee of the American Academy of Neurology.

Bibliographic Source(s)

Iverson DJ, Gronseth GS, Reger MA, Classen S, Dubinsky RM, Rizzo M. Practice parameter update: evaluation and management of driving risk in dementia: report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology. 2010 Apr 20;74(16):1316-24. [41 references] PubMed

Guideline Status

This is the current release of the guideline.

The American Academy of Neurology (AAN) reaffirmed the currency of the guideline in July 2013.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

Definitions of the levels of the recommendations (A, B, C, U) and classification of the evidence (Class I-IV) are provided at the end of the "Major Recommendations" field.

For patients with dementia, consider the following characteristics useful for identifying patients at increased risk for unsafe driving:

- The Clinical Dementia Rating (CDR) scale (Level A)
- A caregiver's rating of a patient's driving ability as marginal or unsafe (Level B)
- A history of traffic citations (Level C)
- A history of crashes (Level C)
- Reduced driving mileage (Level C)
- Self-reported situational avoidance (Level C)
- Mini-Mental Status Examination (MMSE) scores of ≤24 (Level C)
- Aggressive or impulsive personality characteristics (Level C)

For patients with dementia, consider the following characteristics not useful for identifying patients at increased risk for unsafe driving:

- A patient's self-rating of safe driving ability (Level A)

- Lack of situational avoidance (Level C)

There is insufficient evidence to support or refute the benefit of neuropsychological testing, after controlling for the presence and severity of dementia, or interventional strategies for drivers with dementia (Level U).

Definitions:

Classification of Recommendations

Level A = Established as effective, ineffective, or harmful (or established as useful/predictive or not useful/predictive) for the given condition in the specified population. (Level A rating requires at least two consistent Class I studies.)*

Level B = Probably effective, ineffective, or harmful (or probably useful/predictive or not useful/predictive) for the given condition in the specified population. (Level B rating requires at least one Class I study or two consistent Class II studies.)

Level C = Possibly effective, ineffective, or harmful (or possibly useful/predictive or not useful/predictive) for the given condition in the specified population. (Level C rating requires at least one Class II study or two consistent Class III studies.)

Level U = Data inadequate or conflicting; given current knowledge, treatment (test, predictor) is unproven.

*In exceptional cases, one convincing Class I study may suffice for an "A" recommendation if 1) all criteria are met, 2) the magnitude of effect is large (relative rate improved outcome >5 and the lower limit of the confidence interval is >2).

Classification of Evidence for Diagnostic Accuracy

Class I = A cohort study with prospective data collection of a broad spectrum of persons with the suspected condition, using an acceptable reference standard for case definition. The diagnostic test is objective or performed and interpreted without knowledge of the patient's clinical status. Study results allow calculation of measures of diagnostic accuracy.

Class II = A case control study of a broad spectrum of persons with the condition established by an acceptable reference standard compared to a broad spectrum of controls or a cohort study where a broad spectrum of persons with the suspected condition where the data was collected retrospectively. The diagnostic test is objective or performed and interpreted without knowledge of disease status. Study results allow calculation of measures of diagnostic accuracy.

Class III = A case control study or cohort study where either persons with the condition or controls are of a narrow spectrum. The condition is established by an acceptable reference standard. The reference standard and diagnostic test are objective or performed and interpreted by different observers. Study results allow calculation of measures of diagnostic accuracy.

Class IV = Studies not meeting Class I, II or III criteria including consensus, expert opinion or a case report.

Clinical Algorithm(s)

The original guideline document contains a sample clinical algorithm for evaluating driving competence and risk management in patients with dementia (see also the "Availability of Companion Documents" field).

Scope

Disease/Condition(s)

Dementia

Guideline Category

Evaluation

Management

Prevention

Risk Assessment

Clinical Specialty

Family Practice

Geriatrics

Internal Medicine

Neurology

Preventive Medicine

Psychiatry

Psychology

Intended Users

Advanced Practice Nurses

Physician Assistants

Physicians

Psychologists/Non-physician Behavioral Health Clinicians

Public Health Departments

Guideline Objective(s)

- To review the evidence regarding the usefulness of patient demographic characteristics, driving history, and cognitive testing in predicting driving capability among patients with dementia
- To determine the efficacy of driving risk reduction strategies

Target Population

Patients with dementia

Interventions and Practices Considered

1. Clinical Dementia Rating (CDR)
2. Mini-Mental Status Examination (MMSE) score
3. Assessment from patients and their caregivers of driving ability and risk
4. Crash history/traffic citation history
5. Neuropsychological testing (insufficient evidence for recommendation)

Major Outcomes Considered

- On-road driving test performance
- Driving simulator performance
- Caregiver reports

- Unsafe driving-related automobile crash
- Unsafe driving-related fatal automobile crash

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

2010 Guideline

Relevant articles published between 1970 and December 2006 were identified using the search strategy listed in appendix e-3 on the Neurology® Web site at www.neurology.org.

The lead author and a university research librarian searched the Medline database for relevant articles with English abstracts published between 1970 and December 2006. The search strategy is listed on the Neurology® Web site. A second computer-assisted search examined CINAHL, Academic Search Premier, PsycInfo, Global Health, Cochrane Controlled Trials Register, NTIS, Health and Safety Science Abstracts, Risk Abstracts, Web of Science, Ageline, WorldCat, and TRIS. Next, the SafetyLit database was searched using the keyword "driving" (only one search word is permitted). A secondary bibliography search of all full-text articles was performed.

Sources were excluded if they:

- Did not present primary research findings.
- Included drivers who had confounding medical conditions such as major psychiatric diseases, vestibular disorders, alcoholism, or other forms of drug addiction.
- Pertained only to driving with visual impairment that is not caused by some neurological disorder (e.g., homonymous hemianopia with stroke).

Sources were included if they:

- Pertained to automobile driving.
- Had driving (either on road, in a driving simulator, or other computer-simulated aspects of driving) as an outcome measure.
- Involve persons with some type of neurological condition, which includes aging.

Of approximately 6,000 studies identified by the search strategy, 422 were selected for full-text review. A secondary bibliography search yielded 80 additional references.

2013 Reaffirmation

Medline was searched from 2010 April to 2013 July 13 using the following terms: Executive Function* OR Perception OR Attention OR Memory OR Motor Skills OR Language OR Decision Making OR impair* OR decline* OR deficit*) AND ("Automobile Driving"[MAJR] OR "Automobile Driver Examination"[MAJR] OR "Accidents, Traffic"[MAJR] OR "Automobiles"[MAJR] OR "Motor Vehicles"[MAJR] OR driving simulator) AND ("Nervous System Diseases"[MeSH] OR "Tranquilizing Agents"[MeSH] OR "Antiâ€Anxiety Agents"[MeSH] OR "Antipsychotic Agents"[MeSH] OR "Antidepressive Agents"[MeSH] OR "Aged"[MeSH] OR "Aged, 80 and over"[MeSH] OR "Aging"[MeSH] OR "Delirium, Dementia, Amnestic, Cognitive Disorders"[MeSH]) AND (English[Lang]) AND ("1900"[EDat] : "2005/10/13"[EDat]).

Sources were excluded if they:

1. Did not present primary research findings.
2. Included drivers who had confounding medical conditions such as major psychiatric diseases, vestibular disorders, alcoholism, or other

forms of drug addiction.
3. Pertained only to driving with visual impairment that is not caused by some neurological disorder (e.g., homonymous hemianopia with stroke).

Sources were included if they:

1. Pertained to automobile driving.
2. Had driving (either on road, in a driving simulator, or other computer-simulated aspects of driving) as an outcome measure.
3. Involved persons with some type of neurological condition, which includes aging.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Classification of Evidence for Diagnostic Accuracy

Class I = A cohort study with prospective data collection of a broad spectrum of persons with the suspected condition, using an acceptable reference standard for case definition. The diagnostic test is objective or performed and interpreted without knowledge of the patient's clinical status. Study results allow calculation of measures of diagnostic accuracy.

Class II = A case control study of a broad spectrum of persons with the condition established by an acceptable reference standard compared to a broad spectrum of controls or a cohort study where a broad spectrum of persons with the suspected condition where the data was collected retrospectively. The diagnostic test is objective or performed and interpreted without knowledge of disease status. Study results allow calculation of measures of diagnostic accuracy.

Class III = A case control study or cohort study where either persons with the condition or controls are of a narrow spectrum. The condition is established by an acceptable reference standard. The reference standard and diagnostic test are objective or performed and interpreted by different observers. Study results allow calculation of measures of diagnostic accuracy.

Class IV = Studies not meeting Class I, II or III criteria including consensus, expert opinion or a case report.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

All eligible articles were rated by one Quality Standards Subcommittee (QSS) member and one author panel member, using the 4-tiered scheme for rating a diagnostic study's risk of bias (see the "Rating Scheme for the Strength of the Evidence" field). Differences between reviewers were adjudicated by a second QSS member.

The panel reviewed studies of patients with dementia of any cause or mild cognitive impairment. Population studies of aged drivers without an a priori diagnosis of dementia were accepted for analysis when studies limited to drivers with dementia were unavailable or inconclusive. The justification for this is based on the strong correlation between aging and dementia, and the fact that these studies frequently identified individuals with cognitive impairment without a previous diagnosis of dementia. To account for spectrum bias, such studies were downgraded by one evidence

class, per QSS precedent.

The panel considered standardized on-road driving tests (ORDTs) to be the most valid measure. State-administered ORDTs are the de facto legal determinant of driving ability. Driving simulator studies can evaluate driving behavior in (simulated) dangerous circumstances, but have varying degrees of standardization and validity. Crash data are somewhat insensitive, because not all certifiably unsafe drivers have had a crash, and nonspecific, because not all drivers with an at-fault crash are unsafe drivers.

Cohort studies were judged to have a narrow spectrum if they excluded subjects based upon the value of a predictor variable (e.g., a study of the predictive ability of the Mini-Mental State Examination [MMSE] that excluded subjects with MMSE scores less than 25). Case-control studies were judged to have a narrow spectrum if they excluded equivocal outcomes (e.g., a study of at-fault crashes that excluded crashes with indeterminate at fault status).

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

2010 Guideline

American Academy of Neurology (AAN) invited neurologists, a neuropsychologist, an occupational therapist with content domain expertise, and neurologists with methodologic expertise to perform this review.

This practice parameter is an update of the 2000 American Academy of Neurology (AAN) practice parameter on driving and dementia. In addition, this parameter seeks to identify historical features that are associated with increased driving risk. The following clinical questions were developed:

1. How strongly are global measures of dementia severity associated with decreased driving ability?
2. To what extent are patients and their caregivers able to assess driving ability and risk?
3. Which elements of the driving history are associated with decreased driving ability?
4. Which neuropsychological tests provide additional prognostic information?
5. Are there any interventions that reduce driving risk?

The strength of the practice recommendations was directly linked to the class of evidence using the scheme described in the "Rating Scheme for the Strength of the Recommendations" field.

2013 Reaffirmation

An author conducted a literature search using the same criteria as presented in the original guideline. Because the guideline recommendations would not changes given the new literature available, the committee voted to reaffirm the guideline, stating that the conclusions and recommendations are still valid.

Rating Scheme for the Strength of the Recommendations

Classification of Recommendations

Level A = Established as effective, ineffective or harmful (or established as useful/predictive or not useful/predictive) for the given condition in the specified population. (Level A rating requires at least two consistent Class I studies.)*

Level B = Probably effective, ineffective or harmful (or probably useful/predictive or not useful/predictive) for the given condition in the specified population. (Level B rating requires at least one Class I study or two consistent Class II studies.)

Level C = Possibly effective, ineffective or harmful (or possibly useful/predictive or not useful/predictive) for the given condition in the specified population. (Level C rating requires at least one Class II study or two consistent Class III studies.)

Level U = Data inadequate or conflicting; given current knowledge, treatment (test, predictor) is unproven.

*In exceptional cases, one convincing Class I study may suffice for an "A" recommendation if 1) all criteria are met, 2) the magnitude of effect is large (relative rate improved outcome >5 and the lower limit of the confidence interval is >2).

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

The Quality Standards Subcommittee of the American Academy of Neurology (AAN) reviewed and approved a draft of the article. The draft was next sent to members of the Practice Committee of the AAN for further review and then to Neurology® for peer review. Boards of the AAN reviewed and approved the final version of the article. At each step of the review process, external reviewers' suggestions were explicitly considered. When appropriate, the expert panel made changes to the document.

The guideline was approved by the Quality Standards Subcommittee November 5, 2008; by the Practice Committee February 5, 2009; and by the AAN Board of Directors December 14, 2009.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Accurate identification of patients with cognitive impairment who may be at higher risk for unsafe driving, without unnecessarily restricting those who are safe drivers
- Prevention of at-fault automobile crashes

Potential Harms

Not stated

Qualifying Statements

Qualifying Statements

- This statement is provided as an educational service of the American Academy of Neurology (AAN). It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods of care for a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodologies.

The AAN recognizes that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, based on all of the circumstances involved. The clinical context section is made available in order to place the evidence-based guideline(s) into perspective with current practice habits and challenges. No formal practice recommendations should be inferred.

- Qualitative risk estimates, based on imperfect data, are a familiar part of clinical practice. However, clinicians may be less comfortable making such judgments in a legal context; for example, to comply with mandatory state reporting of dementia that "could" (Pennsylvania), "may" (Oregon), or "is likely to" (California) result in driving impairment. When the threshold for "likely" impairment is low (e.g., CA: "inability to perform one or more functions of daily living") or unclear, some clinicians may choose to report borderline cases. In some states, doing so may leave them open to civil litigation. This practice parameter cannot operationalize these types of subjective statutory requirements; it is intended for use in a clinical setting to assist in an evidence-based estimate of driving risk.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Chart Documentation/Checklists/Forms

Clinical Algorithm

Patient Resources

Quick Reference Guides/Physician Guides

Resources

Slide Presentation

Staff Training/Competency Material

Wall Poster

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Safety

Identifying Information and Availability

Bibliographic Source(s)

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Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2010 Apr 20 (reaffirmed 2013 Jul 13)

Guideline Developer(s)

American Academy of Neurology - Medical Specialty Society

Source(s) of Funding

American Academy of Neurology (AAN)

Guideline Committee

The Quality Standards Subcommittee

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

Conflict of Interest

The American Academy of Neurology (AAN) is committed to producing independent, critical and truthful clinical practice guidelines (CPGs). Significant efforts are made to minimize the potential for conflicts of interests to influence the recommendation of this CPG. To the extent possible, the AAN keeps separate those who have a financial stake in the success or failure of the products appraised in the CPGs and the developers of the guidelines. Conflict of interest forms were obtained from all authors and reviewed by an oversight committee prior to project initiation. AAN limits the participation of authors with substantial conflicts of interest. The AAN forbids commercial participation in, or funding of, guideline projects. Drafts of the guidelines have been reviewed by at least three AAN committees, a network of neurologists, Neurology® peer reviewers,

and representatives from related fields. The AAN Guideline Author Conflict of Interest Policy can be viewed at www.aan.com .

Financial Disclosures

Dr. Iverson reports no disclosures. Dr. Gronseth serves as an editorial advisory board member of Neurology Now; serves on a speakers' bureau for Boehringer Ingelheim; and receives honoraria from Boehringer Ingelheim and the American Academy of Neurology. Dr. Reger has served on the Journal of Psychological Training Review Board and the Medical Science Monitor International Reviewers Panel; and has received research support from the Telemedicine and Advanced Technology Research Center AMEDD Advanced Medical Technology Initiative. Dr. Classen has received travel expenses and/or honoraria for lectures or educational activities not funded by industry; and has received research support from the NIH (1R21AG031717-01 [PI]), the VA (00066678 [Co-I]), Florida Department of Transportation (Project Director), and Center for Applications of Psychological Type (PI). Dr. Dubinsky has served on the scientific advisory board and speakers' bureau for Allergan, Inc.; has received honoraria from BrioMed; has received research support from Allergan, Inc., Merz Pharmaceuticals GmbH, and the NIH [NHGRI/NINDS 1R01HG02449-01 (site investigator), NIAM/NINDS R01NS052592 (site investigator), NIAM/NINDS R01NS052619-01 (site investigator), NIAM/NINDS R01NS052592-01 (site investigator), NCCAM 2007P000827 (site investigator), NCCAM UO1AT000613 (site investigator)]; and his spouse owns stock in Abbott. Dr. Rizzo has received research support from the NIH [NIA AG17177 (PI), NIA AG026027 (PI), NINDS NS044930 (Co-PI)].

Guideline Status

This is the current release of the guideline.

The American Academy of Neurology (AAN) reaffirmed the currency of the guideline in July 2013.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

A list of American Academy of Neurology (AAN) guidelines, along with a link to this guideline, is available at the AAN Web site .

Print copies: Available from the AAN Member Services Center, (800) 879-1960, or from AAN, 201 Chicago Avenue South, Minneapolis, MN 55415.

Availability of Companion Documents

The following are available:

- Practice parameter update: evaluation and management of driving risk in dementia. AAN summary of evidence-based guideline for clinicians. St. Paul (MN): American Academy of Neurology (AAN). 2010. 2 p. Available from the American Academy of Neurology (AAN) Web site .
- Practice parameter update: evaluation and management of driving risk in dementia. Case study. St. Paul (MN): American Academy of Neurology. 2010. 3 p. Available from the AAN Web site .
- Practice parameter update: evaluation and management of driving risk in dementia. Slide presentation. St. Paul (MN): American Academy of Neurology. 2010. 51 p. Available from the AAN Web site .
- Practice parameter update: evaluation and management of driving risk in dementia. Poster. St. Paul (MN): American Academy of Neurology. 2010. 1 p. Available from the AAN Web site .
- Practice parameter update: evaluation and management of driving risk in dementia. AAN guideline audio conference – question-and-answer segment. St. Paul (MN): American Academy of Neurology. 2010. 2 p. Available from the AAN Web site .
- Practice parameter update: evaluation and management of driving risk in dementia. Family or caregiver questionnaire. St. Paul (MN): American Academy of Neurology. 2010. 2 p. Available from the AAN Web site .
- Practice parameter update: evaluation and management of driving risk in dementia. Patient questionnaire. St. Paul (MN): American Academy of Neurology. 2010. 2 p. Available from the AAN Web site .
- Sample algorithm for evaluating driving competence and risk management in patients with dementia. St. Paul (MN): American Academy of

Neurology. 2010. 2 p. Available from the AAN Web site .

- AAN guideline development process [online]. St. Paul (MN): American Academy of Neurology. Available from the AAN Web site .

Patient Resources

The following are available:

- Driving with dementia: understanding the safety risks. AAN summary of evidence-based guideline for patients and their families. St. Paul (MN): American Academy of Neurology (AAN). 2010. 2 p. Available from the American Academy of Neurology (AAN) Web site .
- Update: evaluation and management of driving risk in dementia. Public service announcement. St. Paul (MN): American Academy of Neurology (AAN). 2010. Available from the AAN Web site .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This summary was completed by ECRI Institute on August 31, 2010. The currency of the guideline was reaffirmed by the developer in July 2013 and the summary was updated by ECRI Institute on December 22, 2015.

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